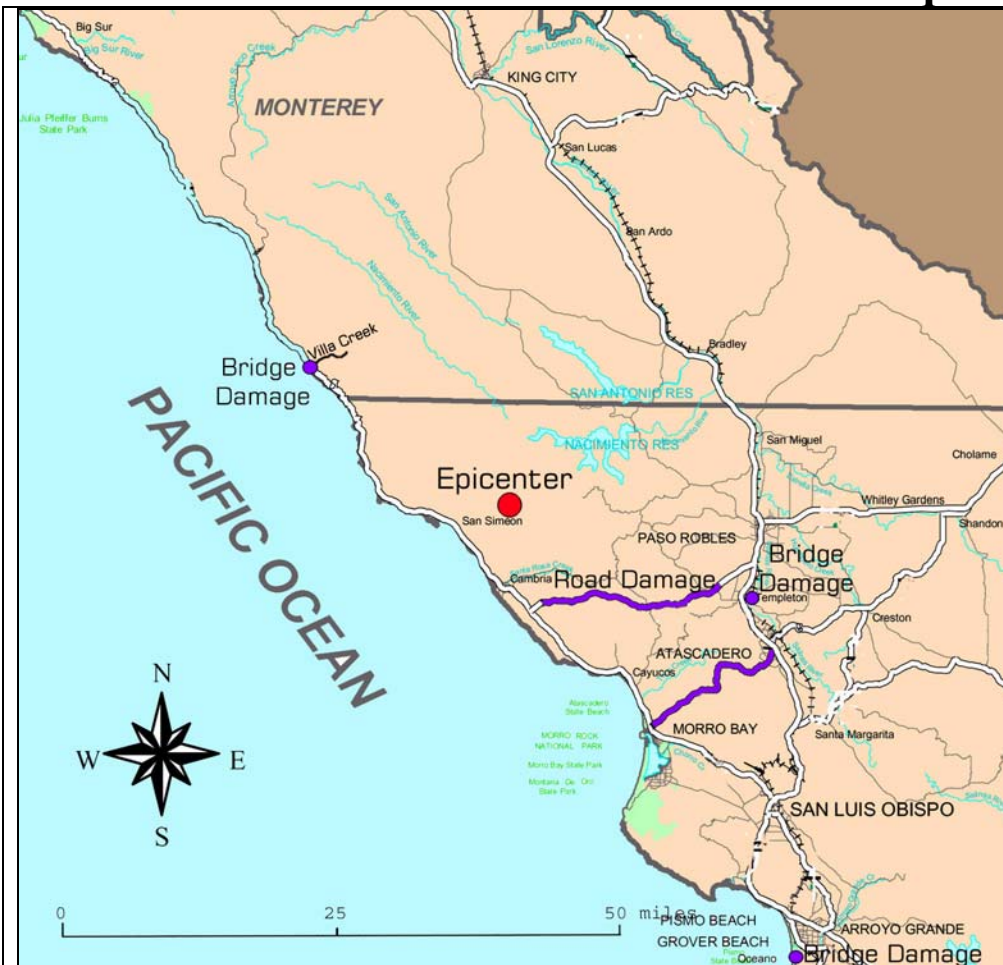


Performance of Roads and Bridges During the December 22, 2003 M6.5 San Simeon Earthquake



Map Showing Epicenter and Damage to Roads and Bridges.

The most serious damage from the San Simeon, California earthquake was the collapse of a building in downtown Paso Robles that killed two people. There was little damage to roads and bridges. A few roads were closed due to structures falling onto them. 12th Street in Paso Robles and Highway 1 in Cambria were closed until debris could be removed. The earthquake occurred in the Santa Lucia Mountains and landslides closed several mountain passes.

This earthquake occurred on the Oceanic-West Huasna Fault: a dipping fault identified on Caltrans Hazard Map. The San Simeon Creek Bridge (13 km from the epicenter) recorded the ground motion ($PGA=0.18g$) but the structural sensors had been removed for repair.



Lew Rosenberg (San Luis Obispo County Geologist) standing in front of damage to Highway 46.

The most significant road damage was to State Routes 41 and 46 between I-101 and I-1. Ron Richman, the District 5 geotechnical engineer writes, *"We observed rock falls originating from cut slopes on Route 41. The Route 46 damage included surging of landslides, spreading of tall embankments and fissuring at the contacts between the original ground and tall embankments. We did not observe significant effects on the bridges in the region. We looked for indications of liquefaction, but found none."* This damage was sufficient to keep Caltrans busy with repairs.



Villa Creek (State) Bridge (44 0028) in Monterey County.

Villa Creek Bridge, seven miles north of San Luis Obispo County, was the only Caltrans structure that was damaged during the earthquake. This is a five simple-span, precast girder structure on Highway 1, along the Pacific coast. The deck is supported on tall single column bents. The bridge was recently retrofit, which didn't protect it from a rockslide that put a hole in the northeast girder web. However, this damage did not reduce the girder's ability to carry traffic and the bridge remained open following the earthquake.



Templeton Road (County) Bridge (49C 0177) less than a mile east of I-101 in San Luis Obispo County.

The Templeton Road Bridge spans over the Union Pacific RR and the Salinas River. The west two spans are CIP girders and the east five spans are RC box girders. The superstructure is on flared, single column bents with piles and on seat and end diaphragm abutments on spread footings. The bridge was not retrofit. Most of the damage was due to liquefaction, settlement, and shaking of the superstructure. The approaches settled about 5 inches. The barrier rail and utility lines were also damaged. Soil borings were taken before a chip seal was placed at the approaches.



Lakeside Ave (County) Bridge (49C 0126) in Oceano.

A lagoon in Oceano frequently floods its banks. The town was built on the loose, saturated alluvium carried by these floods.

This soil liquefied during the earthquake causing considerable damage. There are three timber trestle bridges that cross over the lagoon and they were all damaged due to lateral spreading. The seat-type abutments moved toward the lagoon cracking the timber stringers and splitting the timber bent caps. These bridges look fairly new and the lumber appears to have been recently purchased.